

REMARKS/ARGUMENTS

Claims 1-19 are pending in this application. Claims 1 and 5 have been amended. New claims 20 and 21 have been added. Upon entry of this amendment, claims 1-21 will be pending.

Rejection under 35 USC §102

Claims 1-3, 5-7 and 10-19 are rejected as being anticipated by Kajita et al ("Kajita"). Kajita teaches a radiation-sensitive composition which comprises: (A) a polymer containing (a) a recurring unit (I) of formula (1), with or without a recurring unit of maleic anhydride [formula (2)], and (b) a recurring unit (III) having at least two polymerizable carbon-carbon double bonds and at least one acid-decomposable divalent group of formula (3) or (4); and (B) a photoacid generator. The (A) component above is preferably a copolymer having an alicyclic skeleton (e.g. a norbornene derivative) on the main chain and a crosslinking structure cleavable by the action of an acid. The crosslinking structure taught by Kajita must have a tertiary carbon ester group of formula (3) or a tertiary carbon carbonate group of formula (4). Of the substituents A, B, X and Y on the norbornene derivative ring of formula (1), at least one of A and B is an acid-decomposable organic group (e.g. t-butoxycarbonyl as shown in formula 20-1 of Synthesis Example 8), and X and Y can be either hydrogen or an alkyl group. As the Examiner points out, repeating unit (20-2) in Synthesis Example 8 of Kajita establishes that X and/or Y can be a straight C1 alkyl group including an hydroxyl group.

The present invention discloses a photoresist polymer (e.g. the polymer of Chemical Formula 5) derived from a mixture of monomers comprising 2 or more alicyclic olefin (e.g. norbornene) derivatives of chemical formula 4 having substituents R₁, R₂, R₃ and R₄ on the alicyclic ring, and a cross-linking monomer of Chemical Formula 1. As shown in Chemical Formulas 6 in Example 1, and Chemical Formula 7 in Example 2, the present application teaches preferred embodiments of the photoresist polymers of the present invention that have repeating units wherein at least one of the substituents R₁, R₂, R₃ or R₄ on the alicyclic ring is a group including an hydroxyl group other than an alkyl group including an hydroxyl group. For

example, repeating unit a2 in Chemical Formulas 6 and 7 includes an ester group substituent having an hydroxyl group. In order to more particularly point out and distinctly claim this aspect of the invention, claims 1 and 5 have been amended to specify that at least one of R₁, R₂, R₃ and R₄ is a straight or branched C₁₋₁₀ ester including at least one hydroxyl group, straight or branched C₁₋₁₀ ketone including at least one hydroxyl group, straight or branched C₁₋₁₀ carboxylic group including at least one hydroxyl group, or straight or branched C₁₋₁₀ acetal including at least one hydroxyl group. Since Kajita neither teaches nor suggests such polymers or processes for preparing them, applicants respectfully submit that amended claim 1, as well as claims 2-4 and 11-19 dependent thereon, and amended claim 5, as well as claims 6-10 dependent thereon, avoid the rejection and are in condition for allowance.

Rejection under 35 USC §103

Claims 8 and 9 are rejected as being obvious over Kajita. As discussed above, claim 5, on which claims 8 and 9 are dependent, has been amended to require that at least one of the substituents R₁, R₂, R₃ or R₄ of the formula for the alicyclic monomer used in the process represents a straight or branched C₁₋₁₀ ester including at least one hydroxyl group, straight or branched C₁₋₁₀ ketone including at least one hydroxyl group, straight or branched C₁₋₁₀ carboxylic group including at least one hydroxyl group, or straight or branched C₁₋₁₀ acetal including at least one hydroxyl group. Even assuming, arguendo, that the pressure limitations of claim 8 and the organic solvent of claim 9 would have been obvious from the teachings of Kajita, nothing in Kajita suggests the use of the alicyclic monomers of amended claim 5. Accordingly, it is respectfully requested that the rejection of claims 8 and 9 be withdrawn.

Applicants thank the Examiner for indicating that claim 4 contains allowable subject matter. As discussed in detail above, it is submitted that the rejection of claim 1, upon which claim 4 is ultimately dependent, should be withdrawn in view of the present amendment. Accordingly, claim 4 is no longer dependent on a rejected base claim and should be in condition for allowance as written.

New claims 20 and 21

New independent claims 20 and 21 have been added to expressly claim a photoresist polymer, and a process for preparing it, wherein an alicyclic monomer of original claim 1 is admixed with a preferred cross-linking monomer of Chemical Formula 2 or Chemical Formula 3, as disclosed in the present application on page 3, lines 23-28. As discussed above, the cross-linking monomers taught by Kajita have a tertiary carbon ester group of formula (3) or a tertiary carbon carbonate group of formula (4). Kajita does not teach or suggest the cross-linking monomers set forth in new claims 20 and 21, which are free of such tertiary carbon groups.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



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